PCAN-Wireless Gateway DR

CAN to WLAN Gateway
in DIN Rail Plastic Casing

User Manual

Document version 1.1.0 (2014-01-22)

PEAK System

Products taken into account

Product Name	Model	Part Number
PCAN-Wireless Gateway DR	Industry	IPEH-004011

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Contents

1 Introduction 5
1.1 Properties at a Glance 5
1.2 Prerequisites for Operation 6
1.3 Scope of Supply 7

2 Connectors 8
2.1 CAN1/CAN2 8
2.2 Antenna 9
2.3 RS-232 9
2.4 Power Supply 9

3 Putting into Operation 10
3.1 First Connection to the Gateway 10
3.1.1 Preparing the Computer 10
3.1.2 Establishing the Connection 11
3.2 Basic Configuration 13
3.2.1 Changing Login Data 13
3.2.2 Setting up CAN 13
3.2.3 Connecting to the WLAN Network 14
3.3 Installing the Gateway 16

4 Operation 17
4.1 Status LEDs 17
4.2 Reset Button 18
4.3 Signal Delay 18

5 Configuration 19
5.1 Structure of the Website 21
5.1.1 Header 21
5.1.2 Navigation 21

5.1.3 General Symbols 22
5.2 Status 23
5.3 Routing 24
5.3.1 Manage Routes 25
5.3.2 Add Route 27
5.3.3 Scan for Devices 31
5.4 Network 32
5.4.1 CAN 32
5.4.2 WLAN 34
5.4.3 WLAN Network Scan 38
5.5 Device 39
5.5.1 Device Configuration 40
5.5.2 User Management 42
5.5.3 Software Update 44
5.6 Support 45

6 Application Examples 46
6.1 Unidirectional Data Transmission 46
6.2 Bidirectional Data Transmission 49

7 Technical Specifications 53

Appendix A CE-Certificate 55

Appendix B Dimension Drawing 56

1 Introduction

The PCAN-Wireless Gateway DR allows the connection of different CAN busses over IP networks. CAN frames are wrapped in TCP or UDP message packets and then forwarded via the IP net from one device to the other. The PCAN-Wireless Gateway DR provides one WLAN connection and two High-speed CAN interfaces. With its DIN rail casing and the support of the extended temperature range, the module is suitable for use in an industrial environment.

The configuration of the device is done via a comfortable web interface. Besides providing a variety of status information, the website can directly manage settings for the device itself, communication interfaces, and message routing.

1.1 Properties at a Glance

- ARM9 Freescale iMX257 with 16 kByte Level 1 Cache and 128 kByte internal SRAM
- 256 MByte NAND Flash and 64 MByte DDR2 RAM
- Linux operating system (version 2.6.31)
- RS-232 connector for serial data transfer (reserved for future use)
- Connections for CAN, RS-232, and power supply via 4-pole screw-terminal stripes (Phoenix)
- Reboot and reset of the device to factory defaults with a reset button
- Configuration of the network interfaces and the message forwarding through a web interface

- Plastic casing (width: 22.5 mm) for mounting on a DIN rail (DIN-EN 60715 TH35)
- LEDs for device status, WLAN, and power supply
- Voltage supply from 8 to 30 V
- Extended operating temperature range from -40 to 85 °C (-40 to 185 °F)

Properties CAN:

- Two High-speed CAN channels (ISO 11898-2)
- Bit rates up to 1 Mbit/s
- Compliant with CAN specifications 2.0A (11-Bit ID) and 2.0B (29-Bit ID)
- Galvanic isolation of the CAN channels up to 500 V against each other, against RS-232 and the power supply
- NXP PCA82C251 CAN transceiver

Properties Wireless:

- WLAN IEEE 802.11 b/g
- 2.4 GHz dipole antenna, connection via RP-SMA aerial socket
- Data transmission using TCP or UDP
- Bluetooth 2.1 + EDR, Class 1 (reserved for future use)

1.2 Prerequisites for Operation

- Voltage supply in the range of 8 to 30 V

1.3 Scope of Supply

- PCAN-Wireless Gateway DR in DIN rail plastic casing
- 2.4 GHz dipole antenna
- Mating connectors (Phoenix, Type: MSTB 2,5/4-ST BK) for both CAN channels, RS-232, and power supply
- Manual in PDF format

2 Connectors

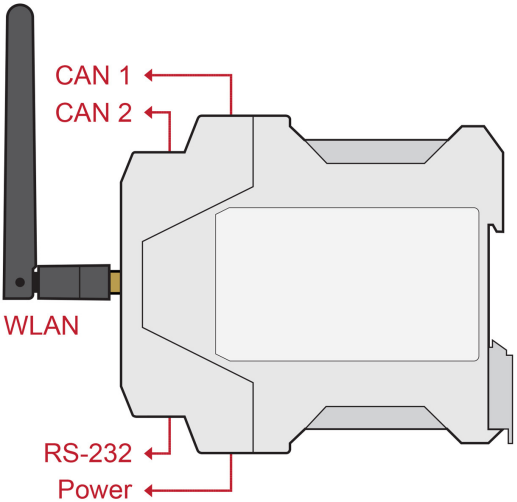

Figure 1: Position of the connectors

2.1 CAN1/CAN2

The CAN connectors are located on the upper side of the casing.

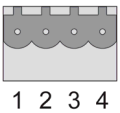

Figure 2: Pin assignment
CAN connector 1 + 2

Pin	Function
1	CAN-High
2	CAN-Low
3	CAN-GND
4	CAN-Shield

2.2 Antenna

The connector for the antenna is centered on the front of the casing. The included antenna must be mounted here. The connection to the WLAN will be established via the antenna.

2.3 RS-232

The RS-232 connector is located on the lower side of the casing.

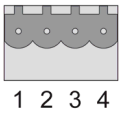

Figure 3: Pin assignment RS-232 connector

Pin	Function
1	GND
2	RxD
3	not connected
4	TxD

2.4 Power Supply

The connection for the power supply is located on the lower side of the casing.

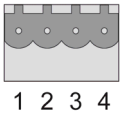

Figure 4: Pin assignment Power connector

Pin	Function
1	GND
2	not connected
3	Vbat (8 - 30 V DC)
4	Shield (DIN rail potential)

3 Putting into Operation

The PCAN-Wireless Gateway DR is configured via a web interface. In the delivery state and after resetting to factory defaults, the device provides an Ad-Hoc network you can connect to via WLAN.

3.1 First Connection to the Gateway

During initial operation or after resetting to factory defaults, you must pre-configure the PCAN-Gateway for your WLAN. The default login data is written on the label on the left side of the PCAN-Gateway. Proceed as described in the following subsections:

3.1.1 Preparing the Computer

- Your computer must be configured with an appropriate IP address to connect to the device via WLAN. To determine your IP address and to change it if necessary, follow these steps.

  1. Windows 8, 7, Vista: Click on **Start** > **Control Panel** > **Network and Internet** > **Network and Sharing Center**.
     Windows XP: Click on **Start** > **Control Panel** > **Network and Internet** > **Network Connections** (continue with step 3).
  2. On the left side, open the overview of the network adapters via the following link:
     Windows 8, 7: **Change adapter settings**
     Windows Vista: **Manage network connections**
  3. Do a right-click on the adapter that will be used for the connection to the PCAN-Gateway and select **Properties**.

     The dialog box **Properties of WLAN connection** appears.

4. Windows XP: Select from the list **This connection uses the following items** > **Internet Protocol (TCP/IP)**
   Windows 8, 7, Vista: Select from the list **This connection uses the following items** > **Internet Protocol Version 4 (TCP/IPv4)**.

   Click on **Properties** and the dialog box **Internet Protocol Properties** appears.

   Make a note of the current settings in order to reset the computer later on.
5. Select **Use the following IP address**.
6. Enter an **IP address** in the range from 192.168.1.1 to 192.168.1.254 (but not the PCAN-Gateway's own address which is indicated on the left casing side).
7. Click on **Subnet mask**. 255.255.255.0 is shown. Leave this entry unchanged.
8. Confirm the entries with **OK**.

3.1.2 Establishing the Connection

1. Connect the device to a suitable power supply (8 - 30 V).
2. Wait until the PCAN-Gateway is ready (Status LED is blinking green).
3. Connect the computer to the Ad-Hoc network. The name (SSID) can be found on the left side of the PCAN-Gateway.

Note: A warning appears that this network is not encrypted.

4. Open a web browser on the computer.
5. In the browser's address bar, enter the address of the PCAN-Gateway (see the label on the left side of the device).

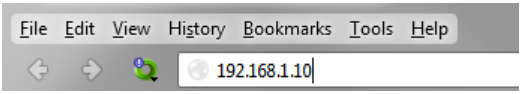

Figure 5: Address bar of the web browser

This opens the configuration website.

6. In the upper right area of the configuration website you can find the login area. Enter “admin” for each the username and the password and confirm with **Enter**.

   The restricted area appears and you can start setting up the PCAN-Wireless Gateway DR. You can find a description of the basic configurations in the following section 3.2.

Note: Afterwards reset the computers IP address to the previously noted address.

3.2 Basic Configuration

Change your login data first and then set up the PCAN-Gateway connection to the WLAN network.

3.2.1 Changing Login Data

1. Open the page **Device** > **User Management**.
2. Change the login data on this page. Create a new username and a new password.

   To ensure a minimum level of security, the password should have at least 8 characters. If possible, use letters, numbers, and special characters.

Important note: Login data is confidential! Do not act carelessly and leave your system open to attack. Never deposit the login data in any form on the Internet or make it easily accessible. Do not give the new login data carelessly to third parties or send it by e-mail.

3.2.2 Setting up CAN

➡ Enter the following settings to configure the CAN channels:

Open the page **Network** > **CAN**.

1. **Bit rate:** For setting the bit rate, click the drop-down menu and select the value that is used on the connecting CAN bus.
2. **Listen-Only-Mode:** If the PCAN-Gateway should act as a pure observer, not affecting the data traffic, Listen-Only-Mode must be enabled. Activate Listen-Only-Mode with a click on the checkbox.

Confirm the entries with **Save Settings**.

3.2.3 Connecting to the WLAN Network

- Accommodate the IP address data of the PCAN-Gateway to the future WLAN network.

1. Open the page **Network** > **WLAN**.
2. In the middle of the page, enter the connection data for the network: Name (SSID), Encryption Type, and Network Key.

   Alternatively, you can select an existing WLAN network on the webpage *Network Scan*. Open the page with the button that is named like the page and select the desired network from the list (see chapter 5.4.3 on page 38).

Note: Regardless of the DHCP information (Enable/Disable), the connection must be entered.

Automatic Address Assignment via DHCP

1. If the future WLAN network uses DHCP (Dynamic Host Configuration Protocol), the PCAN-Gateway IP address and Subnet mask are assigned automatically. Enable DHCP to use this feature.
2. Confirm the entry by **Save Settings**.

   You are automatically logged out and the basic setup of the device is now completed. After the initial configuration, the Ad-Hoc network is no longer available. The PCAN-Gateway connects to the WLAN, and automatically receives its new address data via DHCP.

Note: DHCP is not recommended, because it is necessary to know the IP address of the device to access the configuration website. Furthermore the IP address may change after a restart of the device or the DHCP server. In this case the existing routes won't work.

Manual Address Assignment

1. If the WLAN network does not provide DHCP, enter the address data that the PCAN-Gateway uses in the WLAN Network at the bottom of the page: IP address and Subnet mask. The gateway address can optionally be specified.

2. Confirm the entry by **Save Settings**.

   You are automatically logged out and the basic setup of the device is now completed. After the initial configuration, the Ad-Hoc network is no longer available. The PCAN-Gateway connects to the WLAN, and is reachable under the new fixed IP address.

3.3 Installing the Gateway

Do the following to connect the PCAN-Wireless Gateway DR to an IP network (WLAN):

1. Mount the PCAN-Wireless Gateway DR at the appropriate position on the DIN rail by placing it at the top of the rail and snapping it to the bottom.
2. Connect each of the two CAN ports with the affiliated CAN network.

Note: A High-speed CAN bus needs to be electrically terminated on both ends using resistors of 120 Ω. The device does not have an internal termination.

3. Connect the PCAN-Wireless Gateway DR to a suitable power supply (8 - 30 V DC).

The PCAN-Gateway starts automatically. When the Status LED is blinking green the device is ready and the current configuration is executed. After the start, the PCAN-Gateway automatically connects to the IP network.

Enter the previously assigned IP address in the browser address bar. If no connection can be established, an error may have been made when entering the WLAN connection data. In this case, a reset to factory defaults is needed to reactivate the Ad-Hoc mode and repeat the configuration process (see section 4.2 on page 18).

Note: In case of a dynamic address assignment via DHCP, the new IP address must first be determined. Commercial routers list all connected devices with their current IP address.

4 Operation

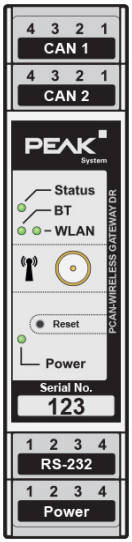

Figure 6: Front side with LEDs and Reset button

4.1 Status LEDs

The PCAN-Wireless Gateway DR has different status LEDs that represent the following conditions:

LEDs	Status	Condition
Status	Green on	System start
	Green blinking	Ready for operation
WLAN	Green on	Active connection
Power	Green on	Power supply is applied

4.2 Reset Button

If the PCAN-Wireless Gateway DR is no longer accessible due to an incorrect configuration, the device can be reset to factory defaults using the reset button.

To perform a reset, press with a paper clip for example into the small hole on the front side of the casing. Press for 1 second to restart the device. Press for more than 5 seconds to reset the PCAN-Gateway to factory defaults.

With a reset to the factory defaults, the IP address and the login data are reset to the initial value (see the label on the left side of the PCAN-Gateway), and the Ad-Hoc mode will be reactivated. Afterwards you can perform a reconfiguration of the device (see chapter 3 on page 10).

4.3 Signal Delay

The signal delay between the CAN connection and WLAN may vary.

The transmit time of the signal in the IP network depends on the expansion and structure of the network as well as the configuration of the message forwarding. Therefore a fixed value cannot be specified.

5 Configuration

Figure 7: Configuration Website

The configuration of the device is done via a comfortable web interface. Enter the IP address of your PCAN-Gateway into the address bar of your browser.

Afterwards the configuration website opens. Besides providing a variety of status information, the website can directly manage settings for the device itself, communication interfaces, and message routing.

The information that is visible to non logged in users (Public Dashboard) can be set on the page *Device > User Management* (see section 5.5.2 on page 42). The login area can be found to the upper right of the website.

Enter your username and password, then press Enter. After logging in you will have access to the 5 main areas of the website: Status, Routing, Network, Device, and Support.

Note: For full functionality and an optimal representation of the website, we recommend one of the following Internet browsers: Internet Explorer 8 or higher, Mozilla Firefox, Safari, Opera or Chrome.

The storing of cookies by the browser is required for to access the website.

Some features of this website require JavaScript. Please enable support for this scripting language if a prompt appears on the website.

5.1 Structure of the Website

5.1.1 Header

The header area of the website displays the product name, as well as a user defined name and description that can be set on the *Device > Configuration* page. This information is used to identify the device.

5.1.2 Navigation

On the left side is the main navigation menu:

- The main pages (Status, Routing, Network, Device, and Support information) display a general information overview
- The subpages of Network and Device provide configuration options for the device and for the network
- The subpages of Routing provide an opportunity for managing, editing, and deleting routes, as well as to search for other devices in the network

The links in the control box (below the menu) perform additional website and device functions

- **Refresh**: Clicking Refresh will perform a page reload, for example to update the current route status

Note: The information displayed on the website is not updated automatically by default.

- **Auto Refresh On / Off**: When you activate this function by left clicking the link, the website will begin to automatically update the information on the page every 10 seconds. You can manually turn this function off by left clicking the link again. Navigating away from the current page will automatically deactivate this function

- **Status LED On**: The status LED on the device will light up for approximately 10 seconds. This function can be used to identify the device
- **Reboot Device**: Use this link to restart the device. During this process, the PCAN-Gateway will be unreachable for a short time

The red framed Info box at the end of the navigation lists important information about the current configuration.

5.1.3 General Symbols

The configuration website uses a variety a different symbols and icons to convey general information that is valid for many situations.

In some cases, additional information is displayed as a tooltip when you hover the mouse cursor over the icon.

Status LEDs	Meaning
	ON / active
	OFF / inactive
	Warning! The execution / function is prevented. The problem is well known and can be eliminated.
	Attention! An error prevents the execution / function.

5.2 Status

On the *Status* page the current device configuration is displayed.

Device Information:

In this box the product name, the order number, and the serial number of the device are displayed. This information can be used to uniquely identify the device.

- On the *Device* page you will find detailed information about the device

CAN Interfaces:

For each CAN channel the status, bit rate, and the setting of the Listen-Only-Mode are displayed.

- The CAN interfaces can be configured on the *Network > CAN* page. In addition, this page provides detailed information about the interfaces

WLAN Interface:

This box displays the WLAN interface settings. IP address, Subnet mask, and gateway are adjustable. The MAC address cannot be changed. Each device receives a unique MAC address during the manufacturing process, which can be used to identify it.

- The WLAN interface can be configured on the *Network > WLAN* page. In addition, this page provides the form to establish a connection to an existing WLAN network

Defined Routes:

Here, each message forwarding is displayed with its basic information. For each of these, the status, used transmission protocol, as well as the source and destination are specified.

- On the *Routing > Manage Routes* page, the routes can be managed, edited, and deleted
- On the *Routing > Add Route* page new message forwarding instances can be created

5.3 Routing

Routing displays basic information about the created routes and PCAN-Gateways detected on the network.

Defined Routes:

Here, each message forwarding is displayed with its basic information. For each of these, the status, used transmission protocol, as well as the source and destination are specified.

- On the *Routing > Manage Routes* page, the routes can be managed, edited, and deleted
- On the *Routing > Add Route* page new message forwarding instances can be created

Detected Devices:

This table shows all PEAK-System gateways that were detected during the last network broadcast scan. If no other devices are currently in the network or no scan has been performed, this table will not be shown.

Each PCAN-Gateway is displayed with its product name, the custom device name, MAC address, and serial number. This information

can be used to identify the device. In addition, the IP address and a small icon of the device are displayed. With a left-click the configuration website of this device can be opened in a new tab.

- On the *Routing > Scan for Devices* page, a search for available devices on the network can be performed

Note: When changing the network topology, the list is not updated automatically. If a device is removed from the network, it will remain visible in the list of detected devices until the scan is performed again and the list is updated.

5.3.1 Manage Routes

On the page *Routing > Manage Routes* the message forwarding instances are listed with basic information and control options. For each of these, the status, used transmission protocol, as well as the source and destination are specified.

Status LEDs: The LED indicates the status of a route.

Status-LEDs	Meaning
	The route is inactive.
	The route is active and connected with the remote site.
	Warning! The route is active but not connected with the remote site.
	PCAN-Gateway handshake is inactive

Source / Destination: The source and the destination depend on the direction of the message forwarding.

In a Receive route the PCAN-Gateway receives data via the IP interface and forwards it to a CAN channel. The IP address is displayed in this case as "Local IP".

In a Send route the data of a CAN channel is forwarded over the IP interface. By left-clicking the IP address of the receiver, its configuration website can be opened.

Protocol: Routes can use TCP or UDP as the transmission protocol in the IP network.

TCP (Transmission Control Protocol) establishes a connection between two subscribers and monitors their communication. If data packets are lost for example, they are retransmitted.

UDP (User Datagram Protocol) sends the data packets directly into the network without establishing a connection. With this protocol, error free transmission is not guaranteed. The advantage UDP has over TCP is the lower demand on performance.

Control Elements:

Symbols	Meaning
	Switch ON / Switch OFF (depending on the current state)
	Delete
	Edit

ON/OFF: Use the "ON / OFF" switch to activate, or deactivate a route.

Delete: Click on the trash can icon to remove the route.

Edit: Click on the pencil icon to edit the route. The route is loaded into the input form on the page *Routing > Add Route*. The same input and configuration options are available there. Detailed information can be found in the following chapter 5.3.2.

Add Route: This button opens the *Routing > Add Route* page on which you can set up a new message forwarding instance.

Additional information:

In Expert mode (see chapter 5.5.2 *Device> User Management*) each route is provided with additional information about its connection and data transfer status. This additional information can be viewed by clicking on the triangle icon located on the right edge of the route.

With the Reset button you can reset the values of the route to 0.

5.3.2 Add Route

On the *Routing > Add Route* page you can set up a new route.

Similarly, an existing route can be edited via the form displayed. For this, the current settings are loaded into the form fields. Editing a route is done via the page *Routing > Manage Routes*.

Regardless of their status up to 8 routes can be created. Then the Add Route function is no longer available.

Route Direction:

When you create a route, you should start with the selection of direction since the following input and output fields are determined by this.

Receive IP > CAN: In a Receive route the PCAN-Gateway receives data via the IP interface and forwards it to a CAN channel. The IP address shown in this case is "Local IP". The configuration of the local IP interface is done on the *Network > WLAN* page.

Send CAN > IP: In a Send route the data of a CAN channel is forwarded over the IP interface. If other PCAN-Gateways were discovered during a broadcast scan, they can be selected for the destination of the route. On the page *Routing > Scan for Devices* you can search for other PCAN-Gateways in the network.

Status:

Use this setting to determine the state of the route after it is created. Ticking the checkbox will have the effect of immediately activating the route after the completed form is saved.

PCAN-Gateway handshake off: (Expert mode only) If this checkbox is active, no handshake will be performed and therefore no status information will be gathered for this route. Use this option for communication with your own application*.

CAN Interface:

Choose one of the available CAN channels. The configuration of the CAN interfaces is done on the page *Network > CAN*.

IP Interface:

IP-Address Source: This field only appears when PCAN-Gateways were detected during a network broadcast scan and direction “Send CAN> IP" is selected.

Select the desired device from this drop-down menu. The following IP address is automatically set to the appropriate value. If you prefer to enter the IP address yourself, select "Manual Input".

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* For information about the data protocol see the PCAN-Gateway developer documentation.

IP Address: Enter the IP address (IPv4) of the destination device. It should be noted that only values from 0 to 255 may be used and certain address ranges are reserved.

- In the first field, enter a value less than 224, since addresses starting from this value are reserved for Multicast messages
- Depending on the Subnet mask, the highest device address is reserved for broadcast messages. For the Subnet mask 255.255.255.0 and the network address 192.168.1.xxx, the reserved address would be: 192.168.1.255
- Depending on the Subnet mask the lowest device address is reserved for messages that are addressed to the entire network. For the Subnet mask 255.255.255.0 and the network address 192.168.1.xxx, the reserved address would be: 192.168.1.0

Port: Enter a port between 1024 and 65535. Values below 1024 are reserved for various system services and must therefore not be used.

Protocol: Select which transmission protocol should be used by the route in the IP network.

TCP (Transmission Control Protocol) establishes a connection between two subscribers and monitors their communication. If data packets are lost for example, they are retransmitted.

UDP (User Datagram Protocol) sends the data packets directly into the network without establishing a connection. With this protocol, error free transmission is not guaranteed. The advantage UDP has over TCP is the lower demand on performance.

Note: Any combination of the IP address, port, and protocol can only be used once.

Frames per Packet: This value specifies how many CAN frames are transmitted per IP packet. The higher the value, the greater the delay in the transmission of CAN messages. However, the demand on performance is lower in this case. This selection is only available for Send routes when using the UDP protocol.

Finally you can create a new route with the Add Route button or save the changes after editing with the Save Settings button.

Note: Transferring data between 2 PCAN-Gateways always consists of a Send and a Receive route. Note that both should use the same transmission protocol (TCP or UDP) and the same port.

5.3.3 Scan for Devices

Using the *Routing > Scan for Devices* page a broadcast message can be sent to the IP network, to which all PCAN-Gateway products report. From the obtained information, a list of available devices is created. The detected devices can then be used as target destinations while creating or editing routes.

Note: When changing the network topology, the list is not updated automatically. If a device is removed from the network, it will remain visible in the list of detected devices until the scan is performed again and the list is updated.

Detected Devices:

This table shows all PEAK-System gateways that were detected during the last network broadcast scan. If no other devices are currently in the network or no scan has been performed, this table will not be shown.

Each PCAN-Gateway is displayed with its product name, the custom device name, MAC address, and serial number. This information can be used to identify the device. In addition, the IP address and a small icon of the device are displayed. With a left-click the configuration website of this device can be opened in a new tab.

Perform Scan: By clicking on the Perform Scan button, the list of available devices is updated. The scan takes a short time. Please wait until you are forwarded.

5.4 Network

The *Network* page provides information about the current configuration of available communication interfaces.

CAN Interfaces:

For each CAN channel the status, the bit rate, and the setting of the Listen-Only-Mode are displayed.

- The CAN interfaces can be configured on the *Network > CAN* page. In addition, this page provides detailed information about the interfaces

WLAN Interfaces:

This box displays the WLAN interface settings. IP address, Subnet mask, and gateway are adjustable. The MAC address cannot be changed. Each device receives a unique MAC address during the manufacturing process, which can be used to identify it.

- The WLAN interface can be configured on the *Network > WLAN* page. In addition, this page provides the form to establish a connection to an existing WLAN network

5.4.1 CAN

The *Network > CAN* page displays the current settings of the CAN interfaces as well as options to configure them. Information about the Status, Listen-Only-Mode, and the bit rate is displayed for each CAN channel.

Channel: The channel number of the CAN interface. This number is used to select the intended interface while creating a route.

Status: The LED indicates the state of the CAN channel.

LED	Status	Meaning
	Active	The channel is active and functional.
	Inactive	The channel is inactive.
	Error Active	Errors were detected on the BUS. The CAN controller's error count is lower than 128. (BUSLIGHT)
	Error Passive	Errors were detected on the BUS. The CAN controller's error count is greater than 127. (BUSHEAVY)
	Bus Off	Errors were detected on the BUS. The CAN controller's error count is greater than 255. The CAN controller has been switched off. (BUSHEAVY)

Bit rate: CAN channel transmission rate. This value should match that of the connected CAN bus.

Listen-Only-Mode: The state of the Listen-Only-Mode is represented by an LED.

Status-LED	Meaning
	Active. The CAN channel is not sending messages, nor is it answering incoming messages (Acknowledge).
	Inactive

Additional information:

Furthermore status information can be viewed, and user defined notes can be entered and saved. Click the triangle icon on the right edge of the list item to view the information. With the Reset button you can reset the CAN channel.

In Expert mode, (See chapter 5.5.2 *Device > User Management*) additional information is displayed.

CAN Channel Configuration:

Each channel is handled and configured by a separate form. Settings can be saved by clicking the Save Settings button located underneath the form.

Bit rate: For setting the bit rate, click the drop-down menu and select the value that is used on the connected CAN bus.

Listen-Only-Mode: If the PCAN-Gateway should act as a pure observer, not affecting the data traffic, Listen-Only-Mode must be enabled. Activate Listen-Only-Mode with a click on the checkbox.

User Notes: Each CAN channel can have a comment. The maximum length of the comment is 125 characters. Click on the pencil icon to open the input field.

5.4.2 WLAN

The *Network > WLAN* page displays the current settings of the WLAN interface and provides options for configuration.

WLAN Interface:

In this box the settings of the WLAN interface will be displayed. IP address, Subnet mask, and gateway are adjustable. The MAC address cannot be changed. Each device receives a unique MAC address during the manufacturing process, which can be used to identify it.

WLAN Connection Settings

With this form you can establish a connection to an existing WLAN. All input fields are mandatory. Please note that these settings are saved together with the address settings below.

Alternatively, you can select an existing WLAN network on the webpage *Network Scan*. Open the page with the button that is named like the page and select the desired network from the list.

Name (SSID): Enter the name of the WLAN you would like to connect to.

Encryption Type: Choose the encryption type that is used by your WLAN from this list.

Network Key: Enter the password that is required to gain access to the WLAN.

In order to save all changes, click Save Settings at the end of this page.

WLAN Address Settings

The WLAN interface can be configured by using this form. Settings can be saved by clicking the Save Settings button located below the form.

DHCP: If the IP uses DHCP (Dynamic Host Configuration Protocol), the PCAN-Gateway IP address, Subnet mask, and gateway address are assigned automatically. Otherwise, you must manually enter the information. Switch DHCP on if required (Enable).

Note: DHCP is not recommended, because it is necessary to know the IP address of the device to access the configuration website. Furthermore the IP address may change after a restart of the device or the DHCP server. In this case the existing routes won't work.

IP Address: Enter here the IP address (IPv4) of the WLAN interface. It should be noted that only values from 0 to 255 may be used and certain address ranges are reserved.

- In the first field, enter a value less than 224, since addresses starting from this value are reserved for Multicast messages
- Depending on the Subnet mask, the highest device address is reserved for broadcast messages. For the Subnet mask 255.255.255.0 and the network address 192.168.1.xxx, the reserved address would be: 192.168.1.255
- Depending on the Subnet mask the lowest device address is reserved for messages that are addressed to the entire network. For the Subnet mask 255.255.255.0 and the network address 192.168.1.xxx, the reserved address would be: 192.168.1.0

Subnet mask: The Subnet mask indicates which part of the IP address represents the network, and which part represents the device. This subdivision is achieved by filling in the (binary) Subnet mask from left to right with the number “1”. The resulting values for the individual fields are: 0, 128, 192, 224, 240, 248, 252, 254 and 255.

While entering values from left to right, as soon as a value smaller than “255” is entered, a “0” must follow. For example 255.255.128.0 is valid, while 255.128.255.0 is false.

Gateway: Enter the IP address (IPv4) of the gateway that manages the IP network. Proceed with the same guidelines as outlined for local IP address entry. Entering a gateway address is optional.

Note: Please note that after modifying these settings, the device may not be reachable. Possible causes for this are:

- You activated DHCP. The IP address of the device is not known because it has been acquired dynamically from the gateway. The address can often be found on a list provided by the gateway.
- You have changed the part of the address assigned to the network (see Subnet mask information). In this case the device is now part of a different network than the one your computer is a part of. Connecting to the device is only possible by respectively adapting your computer's IP address to the different network that the device is in.

WLAN Region Selection

The number of channels respectively frequencies which may be used for WLAN, differ depending on the region. Use this form to specify this setting. Select your region from the list and save the value using the Save Settings button.

5.4.3 WLAN Network Scan

This website lists all available WLAN networks according to their signal strength. Thereby, each net is listed with its name (SSID), the transmit frequency including channel specification, and the encryption type.

Use the Select button to choose the network which you like to connect to. The data will transfer to the website *WLAN* where you can save your information along with the IP address settings.

Note: Please check the information from the *Network Scan* to prevent problems when establishing a connection.

5.5 Device

The *Device* page displays detailed information about your PCAN-Gateway.

General Product Information: In this area, the product name, order number, and the serial number of the device are displayed. This information can be used to uniquely identify the device.

User defined Device Information: The information displayed here can be defined by the user on the *Device > Configuration* page. This information can be used to uniquely identify the device.

Interface Information: This area lists all available communication interfaces regardless of their state.

Version Information: This area shows different information concerning versions:

- Hardware Version: The hardware version indicates the revision of the circuit board
- Software Version: This version number indicates the version of the installed software package. This, additionally to the software, includes the firmware and the website. The software package can be updated on the page *Device > Software Update*
- Website version: This number indicates the version of the configuration website that you are currently using. The website is updated automatically when a software update is processed

5.5.1 Device Configuration

On the *Device > Configuration* page it is possible to assign the device a custom name and description. In addition to that, different import and export options are available.

Custom Device Name and Description:

Use this form to assign a name and description to the PCAN-Gateway. This will aid in identifying the device among other similar devices. The name and description will be shown in the header of the website and other areas.

Name: Enter a name for the device in this field. The maximum length allowed is 50 characters. Please note: This name is separate from the product name that is also displayed in the header area of the website.

Depending on the IP network, it is possible to access the website of the device by typing this name with a previous **http://** in the address bar of the browser.

Description: Enter a description for the device in this field. The maximum length allowed is 200 characters.

The entries can be saved by clicking the Save Settings button located beneath the form.

Import Configuration:

This form allows the importing of locally saved configuration files. After an import, all communication interfaces and device settings, as well as the routes are restored. The current configuration is overwritten within that process.

Use the button on the left side to select a configuration file (*. ini). To start the restoration process, click the Import button located to the right.

Note: If you import a configuration file from another PCAN-Gateway device that is in the same network, its IP address will also be imported and loaded. Both devices would then have the same IP address. This would cause an address conflict and would result in both devices being non accessible.
In such a case, separate one device from the power supply. The other device will then become accessible again and its IP address can be changed manually. This will resolve the address conflict and both devices can be used again.

Export Configuration:

With the Export button an ini file can be downloaded containing all device configurations as well as all route settings.

The file can be freely renamed, the contents of the file however should not be altered. Importing altered configuration files can lead to failures during the import process. Only valid configuration files can be used for device restoration.

Reload Default Settings:

With the Reload button you can restore the device to its factory defaults. During this process the login settings, all device and communication interface settings along with existing routes will be restored to the states they were in at the time of product delivery. The current configuration is overwritten within that process. In addition, the access data will be reset to the default values (see the label on the left side of the device). The PCAN-Gateway is then reachable under the default IP address (192.168.1.10).

5.5.2 User Management

The *Device > User Management* page provides options for entering new login credentials, changing and defining the display mode, and determining what information should be visible on the login page.

Login Settings:

Enter your current login details in the upper part of the form. In the lower part you can enter a new username and a new password. The new password must be confirmed in order to exclude accidental input.

To ensure a minimum level of security, the password should have at least 8 characters. If possible, use letters, numbers, and special characters.

Save your inputs with the Save Settings button.

Important notice: **Login data is confidential!** Do not act carelessly and leave your system open to attack. Never deposit the login data in any form on the Internet or make it easily accessible. Do not give the new login data carelessly to third parties or send it by e-mail.

Display Mode Setting:

This form provides the opportunity to change the display mode. Expert mode enables access to more detailed route and CAN interface status information. Interpreting this information requires a certain amount of knowledge of the TCP/IP and CAN protocols. This setting is valid only for the current session and will be reset with your next login.

Click on the drop-down menu and choose one of the two modes. Save this setting by clicking the Save Settings button.

Public Dashboard:

This form is responsible for defining what information is visible on the website to non-logged in users. Only basic status information can be made visible, configuration options cannot be unlocked publicly.

Activate or deactivate the checkboxes to toggle the visibility of their corresponding information. Confirm your choices with the Save Settings button.

5.5.3 Software Update

Initiating a software update will update the firmware, software, as well as the configuration website. The currently installed software package version is indicated by the software version number. This number can be found on this page *Device > Software Update* itself as well as on the *Device* page.

Current product updates can be downloaded on the PEAK-System website (www.peak-system.com). Please make sure to download the correct package for your device. Every version of the PCAN-Gateway product family has a separate download package.

Perform a software update:

1. Use the button on the left to choose the software package (*.tar).
2. Start the process with the Start Software Update button. Please note: In order to prevent conflicts all CAN interfaces as well as all created routes will be put on standby.
3. After the software update has completed the device will reboot. You will be forwarded to the login page in which case the process was successful and all routes and CAN interfaces have been reactivated.

Note: If the update process was interrupted, you will have to restart the device in order to reactivate the routes and CAN channels. Use the **Reboot Device** link located near the bottom of the main navigation, alternatively you can use the physical **Reset button** located on the device itself.

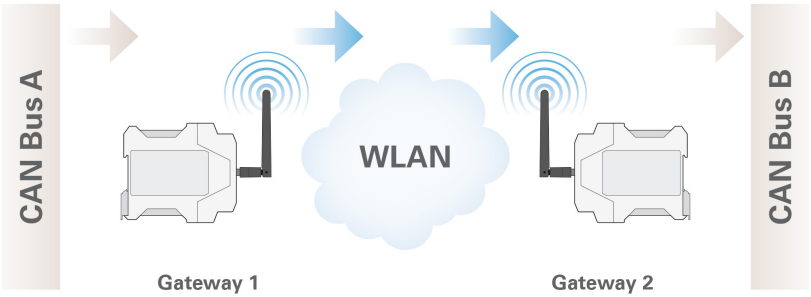
5.6 Support

On the Support page you will find links to product documentation (German and English) as well as contact information of PEAK-System Technik GmbH.

6 Application Examples

The PCAN-Wireless Gateway DR allows the connection of different CAN busses over IP networks. CAN frames are wrapped in TCP or UDP message packets and then forwarded via the IP network from one device to the other. This makes it possible for CAN networks to connect to each other over large distances.

6.1 Unidirectional Data Transmission



For unidirectional data transmission the message traffic from CAN bus A is to be forwarded to CAN bus B via a WLAN network. Necessary for this are two PCAN-Wireless Gateways DR and the creation of a route on each device.

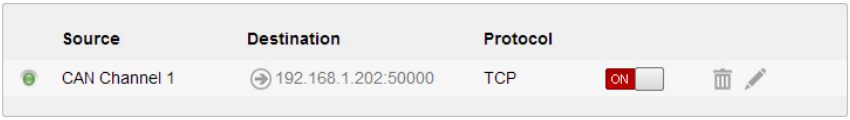
In this example Gateway 1's IP address is 192.168.1.201 and it is connected to CAN bus A via CAN channel 1. Gateway 2's IP address is 192.168.1.202 and it is connected to CAN bus B via CAN channel 2.

Creating a Send Route:

Incoming messages from Gateway 1 are to be transferred into the WLAN network. For this, a Send route with the following values must be created.

Gateway 1 > Send Route		
Route Direction	Send: CAN > IP	
Status	Activate	
CAN	Channel 1 (connected to CAN bus A)	
IP Interface	IP-Address	192.168.1.202 (address of Gateway 2)
	Port	50000
	Protocol	TCP

After saving, the route on Gateway 1 will be displayed on the *Routing > Manage Routes* page as follows.



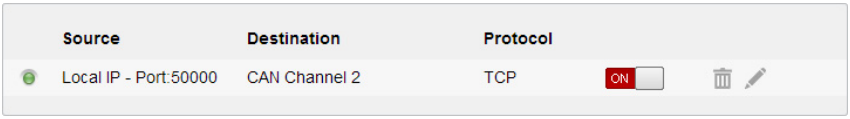
Creating a Receive Route

Gateway 2 is to accept the data packets sent via WLAN network by Gateway 1, and pass the containing CAN messages through CAN channel 2 into CAN bus B. For this, a Receive route with the following values must be created.

Gateway 2 > Receive Route		
Route Direction	Receive: IP > CAN	
Status	Activate	
IP Interface	Port	50000 (like the Send route)
	Protocol	TCP (like the Send route)
CAN	Channel 2 (connected to CAN bus B)	

Transferring data between 2 PCAN-Gateways always consists of a Send and a Receive route. Note that both should use the same transfer protocol (TCP or UDP) and the same port.

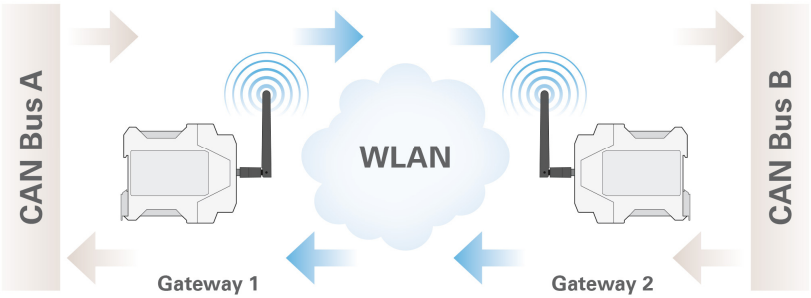
After saving, the route on Gateway 2 will be displayed on the *Routing > Manage Routes* page as follows.



A short time after both routes have been created and activated, the connection will establish. You can interrupt the connection by deactivating or erasing one of the routes on the *Routing > Manages Routes* page.

Note: The putting into operation of a PCAN-Wireless Gateway DR is described in detail in chapter 3 *Putting into Operation*. Detailed information concerning the creation of routes, as well as input and selection options, can be found in chapter 5.3.2 *Add Route*.

6.2 Bidirectional Data Transmission



For bidirectional data transmission the message traffic occurring between CAN busses A and B is to be forwarded via the WLAN network. For this two PCAN-Wireless Gateways DR are needed, where for each one, a Send and Receive route must be created.

In this example Gateway 1's IP address is 192.168.1.201 and it is connected via CAN channel 1 to CAN bus A. Gateway 2's IP address is 192.168.1.202 and it is connected via CAN channel 2 to CAN bus B.

The difference here, when compared with the example in chapter 6.1, is solely that the opposite message forwarding from CAN bus B to CAN bus A must also be realized.

The Routes on Gateway 1:

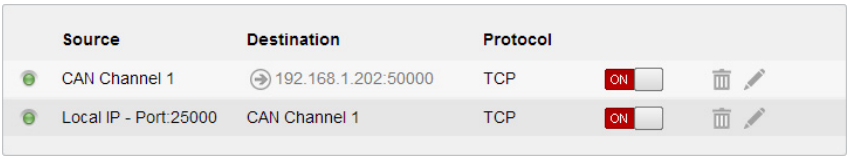
Incoming messages from Gateway 1 are to be transferred into the WLAN network. For this, a Send route with the following values must be created.

Gateway 1 > Send Route A		
Route Direction	Send: CAN > IP	
Status	Activate	
CAN	Channel 1 (connected to CAN bus A)	
IP Interface	IP-Address	192.168.1.202 (address of Gateway 2)
	Port	50000
	Protocol	TCP

Gateway 1 is to accept the data packets sent via WLAN network by Gateway 2, and pass the containing CAN messages through CAN channel 1 into CAN bus A. For this, a Receive route with the following values must be created.

Gateway 1 > Receive Route B		
Route Direction	Receive: IP > CAN	
Status	Activate	
IP Interface	Port	25000 (like the Send route B)
	Protocol	TCP (like the Send route B)
CAN	Channel 1 (connected to CAN bus A)	

After saving, the routes on Gateway 1 will be displayed on the *Routing > Manage Routes* page as follows.



The Routes on Gateway 2:

Gateway 2 is to accept the data packets sent via WLAN network by Gateway 1, and pass the containing CAN messages through CAN

channel 2 into CAN bus B. For this, a Receive route with the following values must be created.

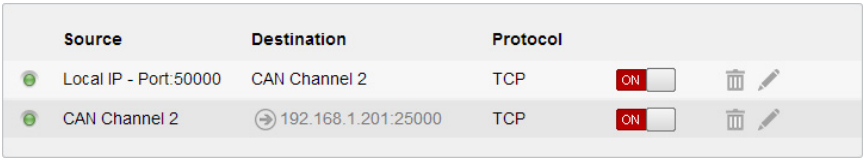
Gateway 2 > Receive Route A		
Route Direction	Receive: IP > CAN	
Status	Activate	
IP Interface	Port	50000 (like the Send route A)
	Protocol	TCP (like the Send route A)
CAN	Channel 2 (connected to CAN bus B)	

Gateway 2 should transmit incoming message traffic from CAN bus B into the WLAN network. For this a Send route with the following values must be created.

Gateway 2 > Send Route B		
Route Direction	Send: CAN > IP	
Status	Activate	
CAN	Channel 2 (connected to CAN bus B)	
IP Interface	IP-Address	192.168.1.201 (address of Gateway 1)
	Port	25000
	Protocol	TCP

Transferring data between 2 PCAN-Gateways always consists of a Send and a Receive route. Note that both should use the same transfer protocol (TCP or UDP) and the same port.

After saving, the routes on Gateway 2 will be displayed on the *Routing > Manage Routes* page as follows.



A short time after all routes have been created and activated, the bidirectional connection will establish. You can interrupt the connection by deactivating or erasing one of the routes on the *Routing > Manages Routes* page.

Note: The putting into operation of a PCAN-Wireless Gateway DR is described in detail in chapter 3 *Putting into Operation*. Detailed information concerning the creation of routes, as well as input and selection options, can be found in chapter 5.3.2 *Add Route*.

7 Technical Specifications

Connectors	
CAN	2 x Phoenix connector 4-pin*
Antenna	RP-SMA antenna socket
RS-232	Phoenix connector 4-pin*
Power	Phoenix connector 4-pin*

CAN	
Specification	ISO 11898-2; High-speed CAN 2.0A (standard format) and 2.0B (extended format)
Bit rates	5 kbit/s - 1 Mbit/s
Transceiver	NXP PCA82C251
Galvanic isolation	Isolation of the CAN channels up to 500 V against each other, against RS-232 and the power supply
Termination	none
Listen-only mode	Separately switchable for both CAN channels

WLAN	
Protocol	TCP, UDP
Antenna	2.4 GHz dipole
Encryption	WPA, WPA2
Bit rates	11 Mbit/s - 54 Mbit/s
Frequency	2.4 GHz, 14 channels
Standard	IEEE 802.11 b/g
Wireless module	WIBEAR-SF1 FCC ID: PV7-WIBEAR-SF-STA EN 300328 EN 301489-1/-17 EC directive 1999/519/EC

* Phoenix connector, type: MSTB 2,5/4-ST BK, order no.: 1756298, www.phoenixcontact.com

Power supply	
Supply voltage	8 - 30 V DC
Max. current consumption	450 mA at 8 V 300 mA at 12 V 120 mA at 30 V

Measures	
Size	22.5 x 99 x 114.5 mm (W x H x D) See also dimension drawing Appendix B on page 56
Weight	111 g (with antenna)

Environment	
Operating temperature	-40 - 85 °C (-40 - 185 °F)
Temperature for storage and transport	-55 - 125 °C (-67 - 257 °F)
Relative humidity	15 - 90 %, not condensing
EMC	EN 55024: 2011-09 EN 55022: 2011-12 EC directive 2004/108/EG
Ingress protection (IEC 60529)	IP20

Appendix A CE-Certificate

PCAN-Wireless Gateway DR IPEH-004011 – EC Declaration of Conformity
PEAK-System Technik GmbH

Notes on the CE Symbol CE

The following applies to the "PCAN-Wireless Gateway DR" product with the item number(s) IPEH-004011.

EC Directive This product fulfills the requirements of EU EMC Directive 2004/108/EG (Electromagnetic Compatibility) and is designed for the following fields of application as for the CE marking:

Electromagnetic Immunity
DIN EN 55024, publication date 2011-09
Information technology equipment – Immunity characteristics – Limits and methods of measurement (CISPR 24:2010);
German version EN 55024:2010

Electromagnetic Emission
DIN EN 55022, publication date 2011-12
Information technology equipment – Radio disturbance characteristics – Limits and methods of measurement (CISPR 22:2008, modified);
German version EN 55022:2010

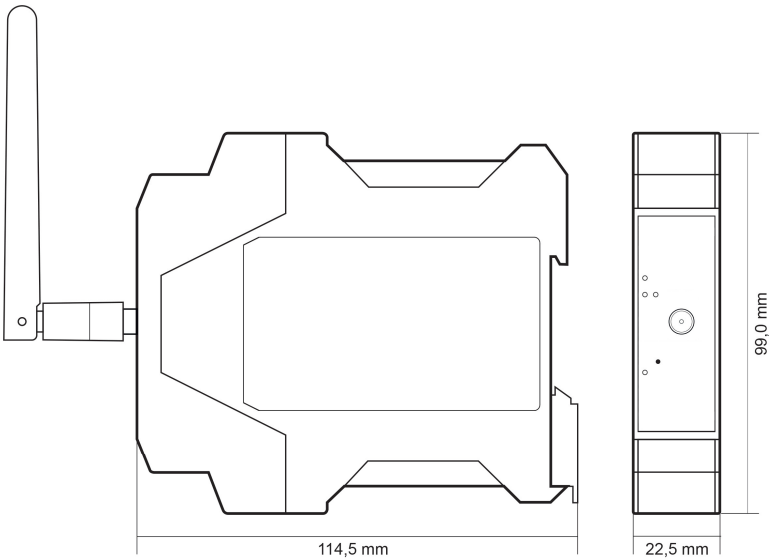
Declarations of Conformity In accordance with the above mentioned EU directives, the EC declarations of conformity and the associated documentation are held at the disposal of the competent authorities at the address below:

PEAK-System Technik GmbH
Mr. Wilhelm
Otto-Roehm-Strasse 69
64293 Darmstadt
Germany

Phone: +49 (0)6151 8173-20
Fax: +49 (0)6151 8173-29
E-mail: info@peak-system.com

Signed this 22nd day of October 2013

Appendix B Dimension Drawing



The figure doesn't show the actual size of the product.